What is claimed is;

1.   A prospective abnormal shadow detecting system comprising a prospective abnormal shadow detecting means which detects a prospective abnormal shadow in an image on the basis of image data representing the image and a prospective abnormal shadow information output means which outputs information on the prospective abnormal shadow detected by the prospective abnormal shadow detecting means, wherein the improvement comprises that

a malignancy judging means which judges whether the prospective abnormal shadow detected by the prospective abnormal shadow detecting means is malignant or benignant is provided, and

the prospective abnormal shadow information output means outputs the information on the prospective abnormal shadow in such a manner that whether the prospective abnormal shadow is malignant or benignant as judged by the malignancy judging means can be distinguished.

2.   A prospective abnormal shadow detecting system as defined in Claim 1 in which the prospective abnormal shadow information output means outputs an index of the malignancy and/or an index of the benignancy of the prospective abnormal shadow.

3.   A prospective abnormal shadow detecting system as defined in Claim 1 in which the malignancy judging means judges whether the prospective abnormal shadow detected by the

44

prospective abnormal shadow detecting means is malignant or benignant by

obtaining a benignancy evaluation function value which is a value of an evaluation function for benignancy, a malignancy evaluation function value which is a value of an evaluation function for malignancy, and a normalcy evaluation function value which is a value of an evaluation function for normalcy by defining feature values of the image data by a predetermined function, and

comparing the normalcy evaluation function value with the benignancy evaluation function value and the normalcy evaluation function value with the malignancy evaluation function value.

4. A prospective abnormal shadow detecting system as defined in Claim 3 in which the malignancy judging means obtains first and second likelihood ratios LR1 and LR2 which are respectively defined to be LR1=normalcy evaluation function/malignancy evaluation function and LR2= normalcy evaluation function/benignancy evaluation function, and determines that the prospective abnormal shadow is malignant when the first likelihood ratio LR1>the second likelihood ratio LR2 and at the same time, the first likelihood ratio LR1>a first threshold value, and that prospective abnormal shadow is benignant when the first likelihood ratio LR1<the second likelihood ratio LR2 and at the same time, the second likelihood ratio LR2>a second threshold value, and otherwise that the

45

prospective abnormal shadow is a shadow of a normal part.

5. A prospective abnormal shadow detecting system as defined in Claim 3 in which the normalcy evaluation function value is the Mahalanobis distance from a normal tissue distribution, the benignancy evaluation function value is the Mahalanobis distance from a benignant tissue distribution, and the malignancy evaluation function value is the Mahalanobis distance from a malignant tissue distribution.

6. A method of judging whether a prospective abnormal shadow detected on the basis of image data representing an image is malignant or benignant comprising the steps of

obtaining a benignancy evaluation function value which is a value of an evaluation function for benignancy, a malignancy evaluation function value which is a value of an evaluation function for malignancy, and a normalcy evaluation function value which is a value of an evaluation function for normalcy by defining feature values of the image data by a predetermined function, and

comparing the normalcy evaluation function value with the benignancy evaluation function value and the normalcy evaluation function value with the malignancy evaluation function value.

7. A method as defined in Claim 6 characterized by the steps of

obtaining first and second likelihood ratios LR1 and LR2 which are respectively defined to be LR1=normalcy evaluation

function/malignancy evaluation function and LR2= normalcy evaluation function/benignancy evaluation function, and

determining that the prospective abnormal shadow is malignant when the first likelihood ratio LR1>the second likelihood ratio LR2 and at the same time, the first likelihood ratio LR1>a first threshold value, and that prospective abnormal shadow is benignant when the first likelihood ratio LR1<the second likelihood ratio LR2 and at the same time, the second likelihood ratio LR2>a second threshold value, and otherwise that the prospective abnormal shadow is a shadow of a normal part.

8. A method as defined in Claim 6 in which the normalcy evaluation function value is the Mahalanobis distance from a normal tissue distribution, the benignancy evaluation function value is the Mahalanobis distance from a benignant tissue distribution, and the malignancy evaluation function value is the Mahalanobis distance from a malignant tissue distribution.

9. An apparatus for judging whether a prospective abnormal shadow detected on the basis of image data representing an image is malignant or benignant comprising

an evaluation function value calculating means which obtains a benignancy evaluation function value which is a value of an evaluation function for benignancy, a malignancy evaluation function value which is a value of an evaluation function for malignancy, and a normalcy evaluation function

47

value which is a value of an evaluation function for normalcy
by defining feature values of the image data by a predetermined
function, and

judging means which judges whether the prospective
abnormal shadow is malignant or benignant by comparing the
normalcy evaluation function value with the benignancy
evaluation function value and the normalcy evaluation function
value with the malignancy evaluation function value.

10. An apparatus as defined in Claim 9 in which the
judging means obtains first and second likelihood ratios LR1
and LR2 which are respectively defined to be LR1=normalcy
evaluation function/malignancy evaluation function and LR2=
normalcy evaluation function/benignancy evaluation function,
and determines that the prospective abnormal shadow is
malignant when the first likelihood ratio LR1>the second
likelihood ratio LR2 and at the same time, the first likelihood
ratio LR1>a first threshold value, and that prospective
abnormal shadow is benignant when the first likelihood ratio
LR1<the second likelihood ratio LR2 and at the same time, the
second likelihood ratio LR2>a second threshold value, and
otherwise that the prospective abnormal shadow is a shadow of
a normal part.

11. An apparatus as defined in Claim 9 in which the
evaluation function calculating means calculates the
Mahalanobis distance from a normal tissue distribution as the
normalcy evaluation function value, the Mahalanobis distance

from a benignant tissue distribution as the benignancy evaluation function value, and the Mahalanobis distance from a malignant tissue distribution as the malignancy evaluation function value.

5